

VALIDATION STUDY OF A NOVEL TEST FOR MEASURING INSULIN SENSITIVITY

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Abstract:

Background: We have previously presented pilot work on a new, low-dose, low intensity, model-based dynamic insulin sensitivity test (DIST). Pilot tests showed good repeatability and the model insulin sensitivity (Si) was highly correlated to the euglycaemic clamp (EIC), ($r = 0.98$, $N = 146$). This test could thus be useful for assessing diabetes and cardiovascular disease risk, and in research on disease states such as PCOS, NASH, CRF, and dementia.

Method: An ongoing validation trial of the DIST against the EIC, the OGTT and HOMA has enrolled 19 men and 21 women ($N = 40$) with a range of BMIs and age range of 21-60 years. The DIST requires 40 minutes and measures insulin sensitivity (Si) in response to a 10g iv glucose bolus and a 1U insulin bolus 10 minutes later. It samples plasma glucose, insulin and c-peptide 8 times during the test. The DIST provides an insulin sensitivity metric (Si) as well as measures of endogenous beta cell function.

Results: The DIST Si range $1.11-22.79 \text{ L}\cdot\text{mU}^{-1}\cdot\text{min}^{-1}$, EIC range $1.97- 15.59 \text{ M}\cdot\text{mU}^{-1}\cdot\text{I}^{-1}$. Preliminary correlation of current Clamp ISI to DIST Si is $R = 0.76$. is promising, and further data will be presented as the study completes. We will also present data to show advantages of the DIST including assessment of Beta cell function, and modification of the DIST depending on the clinical need.

Conclusions: For settings requiring high accuracy and low variability the full DIST (30 minutes, 5 samples, cost \$300) can be used. Alternatively a DISTq can be performed at the bedside (e.g. in intensive care, at a very low cost \$50) measuring only glucose samples with an accuracy less than the full DIST, but measurably better and more repeatable than OGTT or HOMA. Overall, this model-based approach offers significant potential to provide, new, low-cost and low-intensity methods of screening and testing for insulin sensitivity and metabolic risk.